

Working with Stakeholders for Climate Adaptation

Practice-based guidance for participative climate adaptation solutions in urban areas

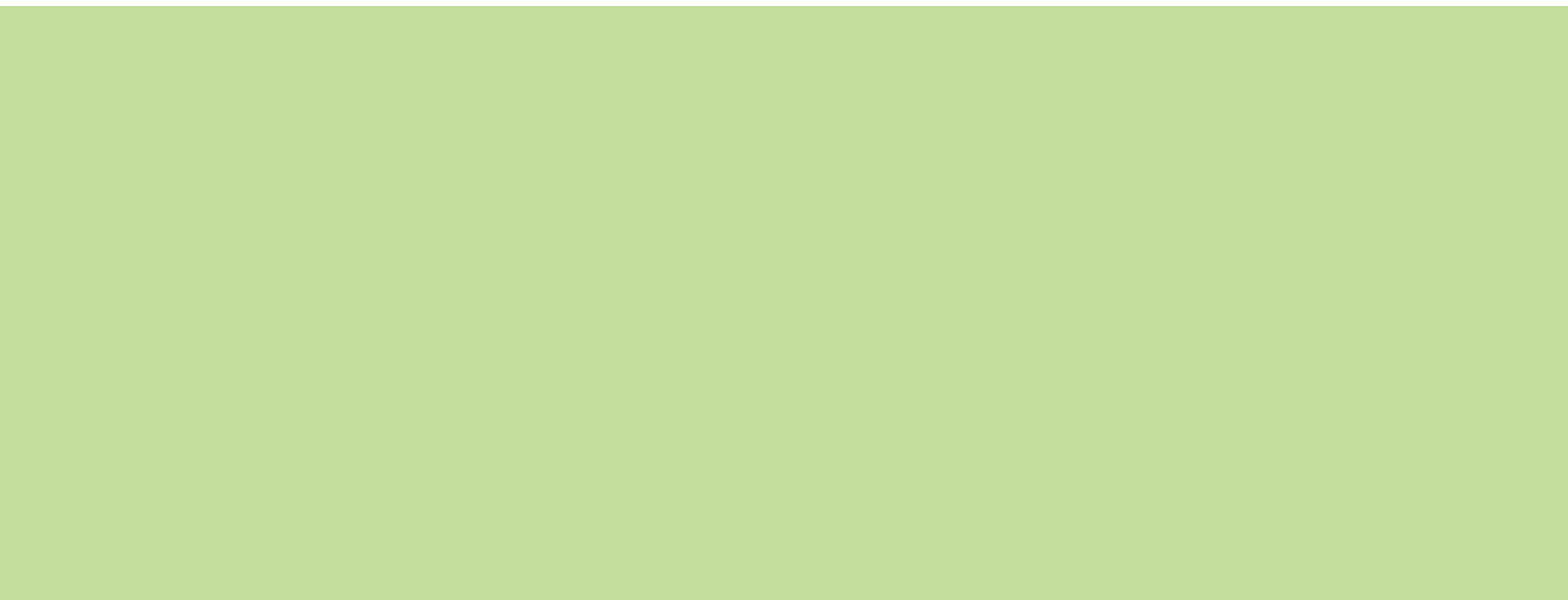


Interreg 
2 Seas Mers Zeeën
SPONGE 2020
European Regional Development Fund



Leiden





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Introduction

SPONGE 2020

The SPONGE 2020 project is an international collaboration between Dutch, British and Flemish governments and organisations. Working collectively, we are exploring ways to tackle the impacts of climate change in urban areas. In particular, we are developing and testing ways to make cities more water-resilient in the face of changes in climate.

The project name, SPONGE 2020, therefore describes the task at hand - how can we improve water management in urban areas and develop towns and cities which act like 'sponges'?

A key focus within the SPONGE 2020 project is working in collaboration with all relevant stakeholders, such as local residents, housing corporations, urban developers, local governments and other interest groups. Taking a participatory approach and enabling the 'co-creation' of solutions with stakeholders contributes to a greater awareness of water in urban spaces and a joint shared responsibility for tackling the effects of climate change.

The project is based around 7 complementary pilot schemes, each working in a different urban setting to develop effective, participative climate adaptation solutions.

European Collaboration

SPONGE 2020 receives funding from the Interreg 2 Seas Mers Zeeën programme (www.interreg2seas.eu). This European Territorial Cooperation Programme covers parts of England, France, the Netherlands and Belgium (Flanders) and is part-financed by the European Regional Development Fund. The program aims to increase collaboration for targets that require an international approach, like dealing with the consequences of climate change.

The SPONGE2020 Toolbox

A key output of the SPONGE2020 project is an online toolbox of help and advice for local authorities and water management organisations who would like to start to take a participatory approach to urban water management and climate change adaptation.

The toolbox is based around a set of methods for stakeholder engagement and co-creation, which have been 'tried and tested' by the SPONGE 2020 partners in their pilot projects. It also includes details about the pilot projects, important types of stakeholders, and steps for stakeholder engagement. It is based within a broader website on urban resilience: 'Urban Green Blue Grids'. Therefore the toolbox also links to descriptions and advice on creating a wide range of on-the-ground climate adaptation measures, with associated case study examples.

What is in this document?

This document is a guide to taking a participatory approach to creating climate adaptation solutions in densely-built areas. The overall aim of this guidance is to increase adaptation capacity and reduce the risk of urban flooding, at a lower investment cost than traditional solutions.

It is a guide to using the SPONGE 2020 toolbox, with additional practice-based and validated recommendations and advice from the implementation and evaluation of the SPONGE2020 pilot projects.

The document will cover all steps of the participatory process, from stakeholder identification, through participation and co-creation, to the implementation of solutions. The guidance can be accessed and used as a single document, or as shorter guides on the various stages and topics.

The aim is to enable city authorities and water management bodies to improve climate adaptation strategies and actions in partnership and cooperation with local stakeholders.

The guidance pack will:

- Provide a guide to using the SPONGE2020 Toolbox website
- Share experiences, advice and lessons learnt from the SPONGE 2020 pilot projects
- Signpost to other useful resources



SPONGE Toolbox and Pilots

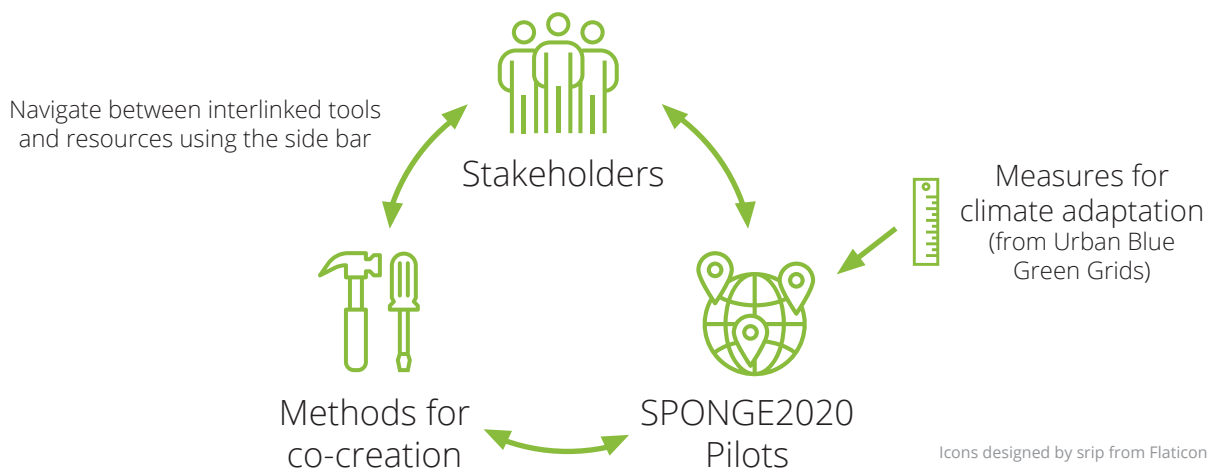
SPONGE 2020 Toolbox on Urban Green Blue Grids

The SPONGE 2020 Toolbox is located on the Urban Green Blue Grids website

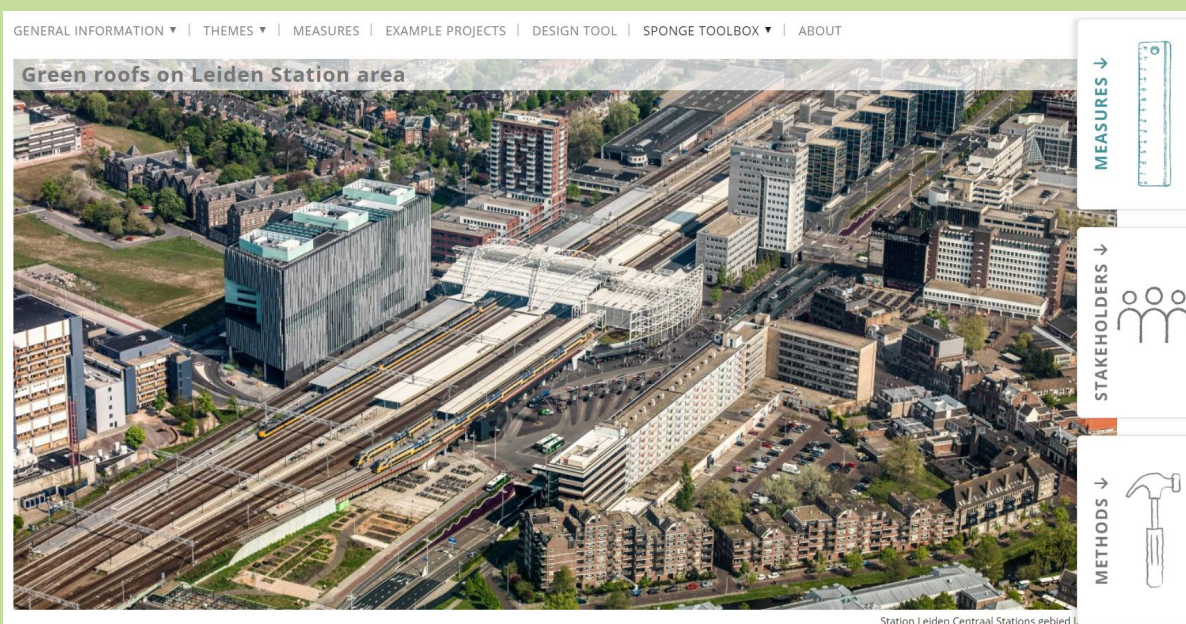
www.urbangreenbluegrids.com/sponge

The toolbox starts with '5 steps to stakeholder engagement'. Based on the experiences of the SPONGE2020 pilots, this page lays out a process for working effectively with stakeholders (see page 8 or Stakeholder PDF).

The toolbox then interlinks three key hubs of resources:



Each of these hubs has multiple pages of tools and resources. On each page, the side bar of the website can be used to navigate the links between the tools and resources. For example, a pilot project may have used a number of co-creation tools (methods), which can be explored via the side bar (shown below).



SPONGE 2020 Pilots

Pilot 1: Participative adaptation solutions for a city district with social housing and small enterprise

The City of Rotterdam is working in a neighbourhood to store rainwater locally, through underground and above-ground measures, such as porous pavements and infiltration crates, while also creating more and better green space. This will be carried out alongside a sewer system upgrade, together improving the resilience of the neighbourhood.

Pilot 2: Participative adaptation solutions in urban public space

The Municipality of Antwerp is leading a 'Garden Streets' pilot project, turning 5 regular streets into garden streets. By integrating more green into a street, the project will help to prevent extreme heat, increase of biodiversity within the city, offer a more serene, quiet and green streetscape, and buffer excess water runoff during heavy rainfall. Enabling infiltration of rainwater into the surface and detaching rain pipes will help to alleviate pressure on the sewerage system.

Pilot 3: Participative adaptation solutions on a hospital site

Working at Basildon University Hospital, Essex County Council are retrofitting rainwater gardens in two courtyards and reinstating a washland (flood attenuation basin) in a derelict area next to the hospital. The project improves the resilience of the hospital to surface flood risk, while creating appealing outdoor space for use by the hospital staff, patients and visitors. In addition, a small number of residential properties are protected downstream.

Pilot 4: Participative adaptation solutions in built areas along a flood-prone river system

Somerset County Council and Westcountry Rivers Trust are creating a network of Sustainable Drainage Systems (SuDS) across Somerset's largest town, Taunton. These SuDS features will reduce the risk of surface water flooding while delivering multiple other benefits, including reduced risk of water pollution, habitats and green spaces for people to enjoy in a designated Garden Town.

Pilot 5: Participative adaptation solutions in commercial city centre

Southend-on-Sea Borough Council is creating an environmentally friendly and visually appealing area in Southend that will improve drainage, reduce the potential impact of climate change and act as a vibrant community space.

Pilot 6: Participative adaptation solutions in mixed function residential/greenhouse area

This Dutch pilot is co-led by the Municipality of Westland and the Regional Water Authority of Delfland. These areas have been affected by flooding and are expected to be further affected, but there is little open space available to collect surplus precipitation. The project is therefore working in new housing developments and in areas of large greenhouses, to find creative solutions which can collect, store and discharge surpluses of water during heavy rain events.

Pilot 7: Participative, innovative adaptation solutions in a densely built historic city

The Municipality of Leiden is leading three sub-projects within its pilot. The 'Noorderkwartier oost' project is trialling different street-based water storage solutions in a densely built neighbourhood. In Lakenpark, a hard surface car park will be transformed into a community green space. And at Leiden Station, rooftop water storage and green spaces will contribute to the wider aim to create 'the most sustainable kilometre of the Netherlands'.

5 Steps to Stakeholder Engagement

Step 1 Identify stakeholders

Start by identifying the important stakeholders who should be involved with your project. Who affects and/or could be affected by the project? This identification can be done using the factor C method (see Resources Section).

1

Step 2 Listen and inform

When you first connect with stakeholders it is crucial to start by listening to their ideas and concerns. Stakeholders may have very different backgrounds, needs, expectations and influence, which may affect their capacity and willingness to cooperate. Then, informing stakeholders about the key program requirements is important to establish a collective starting point.

2

Step 3 Exchange

Next it is useful to identify both ways to work together and barriers that may stand in the way of successful collaboration. Barriers which may need to be addressed could include a lack of information, insufficient financial support, a lack of commitment, or even a historic issue which affects trust between stakeholders.

3

Step 4 Integrate interests

After identifying the interests of the stakeholders, you have to design a strategy or a spatial design which integrates your goals for the plan (e.g. make a water resilient neighbourhood) with the interests of stakeholders (e.g. the residents need more parking places).

4

Step 5 Agree

The final stage is to present and consult on the plan and come to an agreement. This will then allow you to take the project forwards smoothly with the support of stakeholders.

5

Types of stakeholder

Urban projects are typically the result of cooperation between many different people and organisations. For example, a project may require the collaboration of the municipality, housing corporations, developers, housing associations, inhabitants, designers, and more.

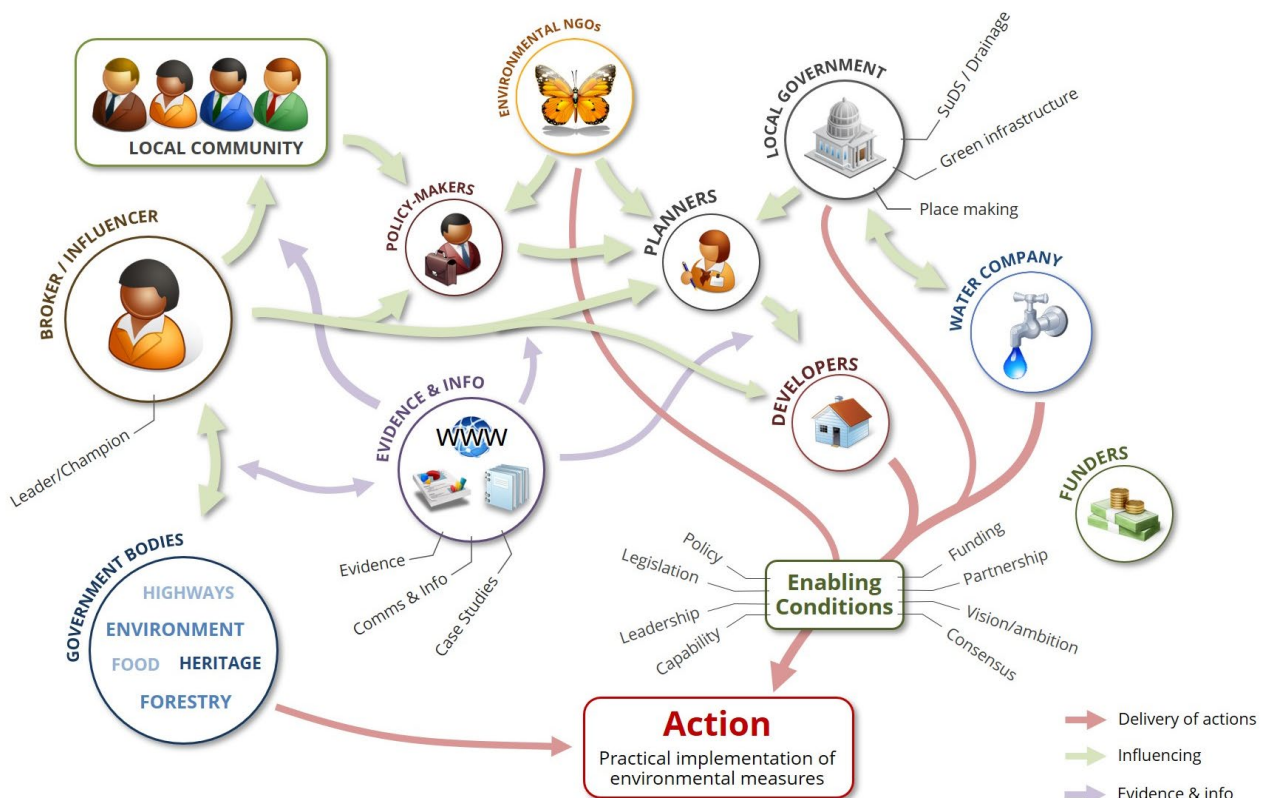
Traditionally, the cooperation within projects is linearly organised: for example, the developer chooses an architect and discusses the plan with the municipality's licensing authority. The other experts, such as water and green space specialists, are only involved at a later stage. The various disciplines therefore often work reactively to the decisions of other players involved in the plan. However, the issue of climate change affects so many areas of work that tackling it requires an integrated approach.

Involving all stakeholders at the beginning of the planning process and having them work together is often more efficient and more successful. Collaborative working can lead to planning strategies and urban environment projects which are widely supported and accepted. In addition, agreements can be reached about the financing and ongoing management of longer term schemes.

In the SPONGE Toolbox, the stakeholders who are likely to have an interest in urban environment projects are described and this information can be explored alongside engagement strategies. The key stakeholders within the 2 Seas area included in the toolbox are:

Citizens	Companies	Government	NGOs
- Citizens' organisations/ neighbourhood associations	- Developers	- National Government	Housing corporations
- Tenants	- Private companies	- Provincial Government	Educational institutions
- Private homeowners	- Drinking and waste water companies	- Water Boards	
	- Garden centres	- Municipality	
	- Research institutes		

The diagram below shows how these stakeholders interact to result in action on the ground.



Tools for Stakeholder Engagement & Co-creation

A key aspect of the SPONGE 2020 project is developing, testing and sharing techniques for the co-creation of climate adaptation measures in urban areas. The techniques, or 'tools', are all available to explore on the Urban Green Blue Grids site, and can be accessed directly or through the pilots they were used in, or the stakeholders they are most suited to engaging.

Below are some of the techniques with examples, from the SPONGE 2020 Monitoring & Evaluation process, of how they were used across the 2 Seas region.

Expert tables

In the process of co-creation it is key to involve the whole neighbourhood. However, some subjects within 'climate adaptation' can be quite difficult for a lay-person to understand. An expert table is made up of experts on specific topics alongside representatives of each stakeholder group. They devise solutions together, weigh the solutions against the different criteria of all stakeholders and result in a package of advice from the expert table for the whole neighbourhood community.

SPONGE 2020 example

Rotterdam held a series of group meetings, which included experts and residents.

They found that it was important to create mutual understanding of the wider priorities and concerns of the different stakeholder groups before talking about details. This creates trust between the stakeholders, and prevents intentions from being misinterpreted. In addition, they found that to talk about difficult subjects such as climate change adaptation, everybody at the meeting needs to be on the same level of knowledge. This takes time, but results in more effective co-creation.





Action days

During an action day (or 'do' day) people from the neighbourhood all work together on different actions (micro-interventions) to have more green and blue in their neighbourhood. Activities could include building small gardens in the street, creating community growing spaces or making school playgrounds greener. Such action days can be inspiring and give a real boost to the social coherence and engagement of the local community. In a central place (such as a tent) information and context on the project can be provided for by-passers and the space can be used for briefings and for tea and lunch breaks for the neighbourhood action team.

SPONGE 2020 example

Westcountry Rivers Trust organised an action day to plant up a raingarden in a residential area (above). The aim was to create a sense of ownership and encourage local people to use and look after the garden in the long term.

Visiting inspirational sites

An on-site visit to a showcase project can be convincing and inspiring. New solutions which are unfamiliar can face some resistance. An excursion to a showcase project, for which the desired results have already been achieved, can be effective at dispelling these doubts. It is good to invite residents, administrators and other interested parties involved with the showcase project, such as the designers, the developer and the water board, to share their experiences and strategies for realising the project. A site visit needs to be carefully planned, and should include an introductory presentation and a tour. Participants should be encouraged to ask questions and make comments in order to create genuine interaction and exchange of ideas with the stakeholders of the showcase project. When planning a site visit, it is recommended to make a bad-weather plan, for instance by arranging a large enough indoor venue for presentations and discussions.

To learn about more tools, and for more information on the tools and pilots, visit the Toolbox at www.urbangreenbluegrids/sponge

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Set up a contact point in the neighbourhood

Being present on-site in a neighbourhood creates a low-threshold way for residents and other local groups to participate in your project. It can be a space where local people can gather information about the project and ask questions or raise concerns in a way that suits them. Such a spot is also well-suited to displaying visual information about the project and have informal conversations with interested people. Also, when a project has reached a milestone, it can be celebrated at this central point.

SPONGE 2020 example

By speaking to residents, Westland found out that people liked the idea of creating more green in the streets even if it means giving up one side of the sidewalk, but it would not be popular to reduce the number of parking spaces in order to create more green in the streets.

Questionnaire

A questionnaire is a research instrument consisting of a series of questions for the purpose of gathering information from respondents. The advantages of using a questionnaire are that it is relatively inexpensive, it does not require as much effort from the questioner as verbal or telephone surveys, and the use of standardised answers makes it simple to compile data. However, because respondents must be able to read the questions and respond to them in writing, this method may be inappropriate for some demographic groups.

SPONGE 2020 example

The Rotterdam pilot team used a questionnaire in the neighbourhood of their pilot to gain more insight into the opinions of private properties owners. Through the questionnaire they learnt a lot and found that their initial assumptions about private property were not always correct.



Adaptation Measures

The Urban Green Blue Grids website is a hub of information on urban climate adaptation. Each of the SPONGE 2020 pilots links through to 'Measures', which are on the ground actions and interventions which can be used to make a city more climate resilient.

This section gives some examples of the adaptation measures on the site which have been used in the SPONGE 2020 pilots.

Hollow roads

Making a road concave increases its water capture and drainage capacity. Combined with a pavement (sidewalk) and a slightly raised floor level in the homes built alongside it, this can prevent flooding in the homes.

Rainwater tanks

Rainwater tanks are the simplest systems for homes, and the easiest to install. These capture and store rainwater so it can be used later, for example to irrigate gardens. Commonly used rainwater tanks are not overly large, meaning that they require an overflow if the roof surface to which they are connected is too large. These tanks can be fitted with a pump and if necessary an automatic top-up system. The limited retention capacity means that the yield is low. These tanks will quickly overflow during heavy rainfall.

Bioswales

A bioswale is a ditch with vegetation and a porous bottom. The top layer consists of enhanced soil with plants or grass. Below that layer is a layer of gravel, highly porous volcanic rock or baked clay pellets packed in geotextile. These materials have large empty spaces, allowing the rainwater to drain off.

In bioswale systems, the water running off from roofs and roads does not flow into the sewers but instead is led into the bioswale via above-ground gutters and/or ditches. Bioswales can be incorporated into the green infrastructure and can help enhance biodiversity and quality of life.

In addition, planting more specifically suited vegetation in bioswales can allow bioswales to play a greater part in enhancing the town or city's biodiversity.





Creating, maintaining & improving green areas and increasing surface permeability

Small areas of vegetation, for example green inner-city areas, do not have any effect on a town or city's climate, though they do affect its micro-climate. Small green zones are oases in the urbanised area, where the shade provided by trees and the fewer hot, paved surfaces mean that air and surface temperatures are lower. Many possibilities for introducing green areas into towns and cities on a small scale have not yet been utilised, for example between the rails of tramlines and in places of unused paved surfaces.

Infiltration boxes and infiltration drains/wells

Infiltration wells and infiltration boxes require no above-ground space and offer more storage capacity than above-ground infiltration installations, meaning that more rainwater can be buffered for short spaces of time and gradually released into the groundwater. Infiltration boxes and infiltration wells come in all sizes, for individual homes to facilities for entire city districts. Boxes can be used under roads, sports fields and parking garages, for example, making it possible to use a single area of land for two purposes.

Planting facade gardens

Removing a strip of pavement along the facade of a building allows the rainwater from the facade to infiltrate into the ground. Climbing plants friendly to birds and butterflies increase urban biodiversity. Plants in the ground need to be watered less than potted plants.

Climbing plants growing in a facade garden allow the covered part of the facade to remain cool in summer. If fruit-bearing plants, such as grapevines or redcurrants, are used, the fruit offers food for people and wildlife, for example, birds.

For more information and to learn about more adaptation measures, visit www.urbangreenbluegrids.com/measures

Stories from the SPONGE 2020 Pilots

This section contains stories from the SPONGE 2020 pilots, which provide useful lessons learnt for future climate adaptation projects. The stories cover a range of stages, from stakeholder engagement through design, construction, and through to post-construction follow-up work.

Local authority engagement - gaining site owner permission and approval

Activity Stage: Engagement

Pilot Project: Somerset

Delivering a SuDS retrofit onto a retail car park required the engagement and approval of the district council who owned and operated potential sites. The district council is also responsible for delivering the town's status as a Garden Town – a useful lever for delivering green infrastructure.

Engagement to discuss the opportunity and consider suitable site options was undertaken early in the project. A list of sites for feasibility work was compiled and these investigations were shared with the district council. Artist impressions were used to convey key concepts and benefits, particularly to assist understanding amongst non-technical specialists. The visualisations were used to present SPONGE and urban water management concepts to a variety of teams in planning, landscape design, property and estates, engineering and policy.

The key challenge encountered was a high turnover of staff as part of a reorganisation and merger of the council with another authority. This barrier to delivery and loss of knowledge could not have been foreseen when the project was commenced.

While the project could not move forward as intended, the outcome was that the district council supported the delivery of SuDS retrofit at other sites. Having a greater understanding of the benefits of sustainable approaches to water management also led to changes in their own schemes to incorporate these principles and features. In addition, as planning authority, they expedited the approval of other retrofit schemes to facilitate pilot delivery.

Looking beyond the initial project, these relationships will carry on beyond the end of the EU-funded project SPONGE to meet shared goals on climate change and using SuDS to deliver these outcomes.



Improving Lives



Using interactive activities to engage school children

Activity Stage: Engagement

Pilot Project: Somerset

The Somerset pilot for SPONGE2020 worked with schools to build small-scale sustainable drainage systems (SuDS) to make better use of rainwater in the school grounds. To engage the children with the idea of SuDS, the team visited the schools and ran a series of short interactive activities.

These activities included using demonstration boards to show how water moves through different materials, leading to discussions about how it may be possible to slow the flow of water to the drain.

The activities also included a specially-created version of a well-known game – ‘Top Trumps’ – to get the children learning about and discussing different types of sustainable drainage systems.

These activities could be easily adapted to different situations and to discuss different topics. It was found that it is important to work with quite small groups of children to make sure they are all able to take part and contribute. It is therefore also important to have quite a lot of ‘facilitators’ to explain the activities and keep the children focused. Short training sessions were run beforehand for the facilitators to ensure those running the activities know how to engage with children and keep the activity on track.



Constructing climate adaptation measures at the World Horti Center

Activity Stage: Co-Creation, Detailed Design and Approval/Construction

Pilot Project: World Horti Center, Naaldwijk.

In March 2018 the World Horti Center officially opened, as a place to share innovations in the field of cultivation and water management.

Three different measures have been implemented around the World Horti Centre building to increase the ability of the area to hold and soak up water: a swale, porous paving materials in the parking lots and ground infiltration. These features were selected during design workshops involving the municipality of Westland, the water board of Delfland, gardener Van Der Drift and an infiltration expert.

During these design workshops the landscaper who was going to do the construction work for these measures noted that it would have been cheaper if the measures had been implemented during the construction of the building, rather than once it was built, as was the case. The lesson learned in this case is that it is never too early to start thinking about and designing climate adaptive measures. The earlier they are brought into the conversation, the more cost-effective the construction cost will be.

Co-creation with the residents of a garden street

Activity Stage: Co-Creation

Pilot Project: Five garden streets in Antwerp

A 'garden street' is an excellent measure for climate adaptation as it integrates blue and green infrastructure in urban neighbourhoods while also contributing to an enjoyable living environment and an increase in social interaction and activities in the street.

In the Antwerp pilot, community participation was an important feature in the design process of the garden streets in the city. As the changes in these streets are likely to affect them the most, their input is of great importance. Therefore, residents were closely involved from the very start of the pilot project, providing invaluable cooperation and feedback during the experimental stage and securing their support in maintenance and upkeep once the garden streets are established. Co-creation was carried out in several phases:

Getting acquainted

At the start of the process, the design teams visited the selected streets and got acquainted with their residents. During this first meeting, the team introduced the intention to establish a garden street and broadly explained what this could mean. This first meeting took place in an open atmosphere and no concrete plans or designs were proposed to the residents at this stage.

Dream sessions and feedback

In the second stage, residents were put to work shaping their ideal vision of a garden street during a workshop. Using plans and two dimensional mock-ups, the residents collectively decided on the design details of their garden street. The results were presented to the neighbourhood during a third meeting, encouraging questions including; where in the street would you prefer to have greenery and what kind? Would you like your façade to be covered with greenery? What is your take on maintenance?

Design Sprint

In order to maximize the gains from the design process and include input from the resident into the design, the project teams organized a 'Design Sprint'. During these intensive multi-day sessions, the teams worked on tangible products to implement in the streets and thought about how to set up experiments proceeding the actual construction of the garden street. The Design Sprint concluded with an exhibition in which the teams demonstrated prototypes and concepts to residents and policymakers.

Experimental stage

During the summer, several interventions which arose during the preliminary design were 'mimicked' in the selected street. This experimental stage kicked-off with the residents collectively planting greenery in the street, making the concepts from the preliminary design tangible and visible within the street scape. Already at this stage, residents were in charge of maintaining the green spaces. Residents were therefore able to experience what it would be like to actually live in a garden street, and their feedback could be included in the final design.



Co-designing a water system

Activity Stage: Co-Creation

Pilot Project: Climate proof Agniesebuurt, Rotterdam

During the process of sewer replacement and implementation of climate adaptive measures into the Agniesebuurt public space, led by HHSK and the Municipality of Rotterdam, the plan was forced to a halt. The stakeholders affected had many concerns and questions, and this resulted in insufficient support for the plan as it stood.

The Municipality of Rotterdam, the 'Noord' area commission, HHSK, Havensteder and residents agreed to abandon the existing plan and to instead introduce a proposal for a new participative process, facilitated by an independent participation consultancy, Volq.

Initially, a neighbourhood community was set up (see box below), who worked together on an integrated plan for the outdoor space. An important issue in the Agniesebuurt was how to deal with the negative impacts of climate change, such as heat, water management issues and drought. The project team wanted to look, with the stakeholders, for possible underground and aboveground solutions to counteract these negative effects of climate change and explore potential opportunities. In order to create a water management plan, they set up a 'water expertise panel'. This was necessary because water management is a specialist topic with which not everybody from the community can or even wants to engage.

Experts and representatives from the different stakeholder groups had places on the panel. Their task was to come up with a package of solutions which fulfilled the shared ambition of the community.

The neighbourhood community

The first step in this new participation process was to speak to residents and home owners in the neighbourhood about their interests and concerns for the project. From this, the "Agniesebuurt neighbourhood community" was established, which was central to the participative process. The community exists online (through a website, newsletters and via social media) and offline (through a walk-in consultation hour, information meetings, etc.). As a result, as many residents as possible can contribute according to their own level of expertise and time available.

The first meeting of the neighbourhood community was based around sharing knowledge. All stakeholders were able to gain relevant knowledge about water, sewer systems and climate adaptation. Following this, a group of participants brainstormed options for the follow-up process. Volq presented the outcomes of this brainstorm in a participation plan.

Lessons learned

In practice, it proved difficult to reach and involve all stakeholders. The expectation in advance was that most residents would not be interested, be busy with other matters and/or believe the success of the scheme to be primarily a responsibility for the municipality and the water authority. Fortunately however, enough active residents were involved to make the process worthwhile.

An important lesson learned by the project team was not to organize a plenary residents' evening at the start of such a complex climate adaptation project. It is better to work in advance with existing networks for concerned residents and 'local heroes'. These individual conversations can paint a valuable picture of interests and points of attention before holding a wider public meeting. They can also then play a role as 'ambassadors' in the continuation of the project.

Expert table/panel

It was important that experts on sewerage systems, geohydrology, climate adaptation, construction and building foundations, as well as representatives from the neighbourhood, were present on the panel. In addition, an independent expert, the supervisor, joined to reflect and challenge during discussion, and to bring experience, examples and solutions for inspiration or reference. This person thinks outside the box and discusses positively and critically with the members of the expert table in order to come up with the right concepts, scenarios and issues to consider for the technical design.

Criteria

Although there was a common goal for the Agniesebuurt, there were also various stakeholders with specific concerns and interests. The project team translated the interests of each stakeholder into criteria and merged these into a list of criteria which was handed to the expert table/panel. Because some contradicted each other, the criteria were treated as 'wishes'.

Process

The expert table needed ten meetings to develop their advice for the technical design of the water management solutions. During the first few meetings, the panel had to establish their role, responsibility and mandate and bring everyone up to the same level of knowledge on the key issues. This process took time and was somewhat labour intensive.

After that, the Water Expertise Panel mapped the existing situation and projected expected climate change on to it. Then they collectively suggested and discussed solutions which could be possible within the boundaries of the established criteria and what would be technically feasible. To develop scenarios they first looked for all possible (out of the box) solutions for waste water, stormwater, ground water and surface water. Three scenarios were then compiled from the different elements for every solution, to create a complete water system. They chose to create three scenarios which each included different measures and solutions. The three scenarios were then scored against the various criteria. By combining elements from the different scenarios, a preferred solution as developed, which was both technically feasible and met the criteria of the various stakeholders.

This scenario was then handed to the neighbourhood community as advice on how the water elements of the technical design of the Agniesebuurt should look in their (expert) opinion.



Engaging participants through other trusted stakeholders

Activity Stage: Engagement

Pilot Project: Rainlevelr in Delfland

In the RainLevelr project, greenhouse owners work with the water board and the municipality to partially empty their water stores before heavy rain, and therefore create more storage space to take some of the rainfall and help to reduce the risk of flooding. The current version of Rainlevelr is only available for water storage basins which are being renovated or built new. Therefore, it is important that the growers are engaged at an early stage, when construction plans are being made by the grower.

The project is creating more awareness through conferences and is holding meetings to recruit more participants. However, there is sometimes resistance when the government is trying to reach members of the public. Therefore, the project also tries to reach to potential participants in different ways.

Firstly, the project team have found great success in using current participants as ambassadors. This has been found to be particularly successful because they are the neighbours, family and friends of other growers. People trust each other more than the government and they can hear about the good experience with the project. The ambassadors are proud to participate and help to make Rainlevelr more successful.

Secondly, the project found that suppliers and contractors can help to bring in more participants to the project because they are able to talk to the growers at the right moment: when they are making plans to renovate or build a water storage basin. They can also talk about their experience with Rainlevelr and again this may be useful as it is not the government telling them, but somebody whose opinion they may value and trust. Furthermore, often the project team are informed about potential participants in time to get in contact with the grower. The number of contacts within the group of suppliers and contractors is expanding, and some even mention Rainlevelr on their websites.

Though the above refers specifically to the Rainlevelr project, the ideas and techniques can also be used for other stakeholder engagement. For example, those involved in the project have also had good experiences holding events at garden centres to encourage people to make changes in their gardens. Once the garden centres understand the possibilities of climate adaptation measures and are enthusiastic, they can sell the concepts to their customers and therefore reach many stakeholders. This method of engagement could also be effective by teaming up with landscape architects, or indeed any interesting organisations who could help to tell the story.

The picture below shows one of the proud ambassadors of Rainlevelr.



Designing a lowered meadow, taking inspiration from another project

Activity Stage: Preliminary design and detailed design

Pilot Project: Blue-green redevelopment of the Zuiderdokken square in Antwerp

The “Zuiderdokken”, with a total surface area of 9 hectares, is the largest square in the city of Antwerp. The square is being completely renovated with an emphasis on climate adaptation, because of its strategic location with regard to flood risk. The original design provided by the architect therefore included a combination of different water management measures including permeable surfacing, rain gardens and two large swales.

However, even with all these measures combined, the total water storage was not enough to meet the ambitious aspirations of the City of Antwerp. Another large storage feature was needed, but the question was where to locate it, as space in the square was already largely ‘claimed’ for sports, restaurants and cafés, recreation, trees, gardening and public events.

One of the SPONGE 2020 partner meetings included a visit to the Benthem square in Rotterdam. This square was the first ‘water square’ to be built. When it is dry, the square is a hub for young people to do sports, play and relax. When it rains, areas of the Benthem square also provide water storage, in a visible and interesting way.

Inspired by this visit, AGVespa (the public real estate cooperation), the city and the architect developed the idea of a lowered meadow for the Zuiderdokken square. The meadow is 30cm lower than the rest of the square and will be the last link in a chain of water management. It will therefore only flood under very extreme circumstances.

Similarly to the Benthem square in Rotterdam this lowered meadow combines two functions: recreation (families can sit on the grass, picnic and enjoy the sun) and water storage. However, while the Rotterdam square has a hard pavement, the Antwerp square will be soft and covered with grass.

In the detailed design of the meadow, lessons were learnt from the experience in Rotterdam. For example, significant attention was given to ensuring ease of maintenance, such as easy access of maintenance equipment and simple removal of the excess water, as these issues had been very important in Rotterdam.



Adaptive design in the Rainlevelr project

Activity Stage: Detailed Design and Approval

Pilot Project: Rainlevelr in Delfland

In Rainlevelr, owners of commercial greenhouses contribute to a reduction in flood risk by partially emptying their rainwater basin or silo before a heavy rain event, to enable these spaces to capture the additional water. The growers do this on a voluntary basis. The Delfland Water Board informs the horticulturists about the rainfall forecast and lets them know when extra capacity is required.

The idea of Rainlevelr (though under a different name) first emerged from the growers in the early 2000's after several flood events which resulted in significant financial damage for the horticultural enterprises. Although the initiative proved unsuccessful at the time, the concept was very strong and remained something the Water Board was keen to try again in the future.

The Rainlevelr initiative was originally designed in 2016 for cases where the grower was planning to build a new water basin, or renovate an existing one. Though that was only a portion of growers, it was a place to start. In the Netherlands there are more than 1000 horticultural enterprises where the Rainlevelr system could be implemented, if needed and wanted.

During the implementation of Rainlevelr, the project team came across participants with silos rather than basins. These growers wanted to participate, but the design had to be altered to the physical dimensions of the silos. So Rainlevelr then had 2 different designs: one for basins, and one for silos.

Later, a grower wanted to introduce the system in an existing basin, without a renovation plan. This required some adaptation of the design and method to implement it safely and without risks of leakages. However, by altering the standard design the potential 'market' was increased significantly.

A current development is the full automation of the Rainlevelr process, whereby the grower can remotely control the level of water in their basin, without being present at the site.

Through these cases, the Rainlevelr pilot team learned that in situations where the governmental body are reluctant of taking risks, the growers are willing to go a step further. By rewarding their approach and taking it seriously, they gained a lot of goodwill and the mistrust of commercial enterprises towards the government decreased significantly. The existing participants are now among the project's most valuable ambassadors!



Reuse of existing materials

Activity Stage: Construction

Pilot Project: Basildon Hospital, Essex

During the design and engagement phases for the Courtyards Landscaping and SuDS Scheme at Basildon Hospital, it became clear that the environmental sustainability of the proposed scheme was vital, and that resource efficiency would be an integral part of this. At the same time, it was clear that materials would need to be transported through the hospital - either new materials coming in or materials for disposal coming out. This is a very challenging task in a hospital environment due to various restrictions and health & safety issues.

After a number of face-to-face meetings and telecons with the contractor and the hospital, it was agreed that these issues could be turned around into a fantastic opportunity to boost the project's environmental credentials, minimise disruption to the hospital and at the same time achieve significant financial savings, by reusing as much of the materials as possible on site.

Once construction began, most of the existing pavement slabs, shingle stones, downpipes, breakout materials and furniture were carefully removed, cleaned and put to one side where practicable. This was a lot easier than having to rip them up, dispose of them and bring new ones in, especially in light of the significant constraints associated with moving building materials around in an operational hospital.

Overall, this approach was welcomed by everyone involved – and perhaps one of the biggest lessons learnt is that waste only becomes waste when it's buried in the ground. When undertaking a retrofitting project look at what you're planning to dispose of – does it really need to go, or can you give it a new life?

Mobilising volunteers to take on long-term maintenance

Activity Stage: Post construction

Pilot Project: Basildon Hospital, Essex

One of the main concerns for the pilot project at Basildon Hospital was ensuring the long-term maintenance of the scheme. There was a risk that the landscaped courtyards and the flood attenuation basin would slip into a state of disrepair as maintenance has only been secured for one year after the end of the project, a common problem for projects. There is funding and commitment to put the infrastructure in place but there are usually no arrangements for on-going maintenance costs.

So, working with the contractor, who will be maintaining the site for one year, and with the hospital, the pilot project team decided to engage a group of volunteers to take on the task of maintenance. It was found that there is an existing volunteer group who undertake various activities around the hospital. At the same time, the contractor had been putting together a maintenance plan. So, the team had successfully secured two key elements – the enthusiastic people and the knowledge.

The next steps still to come for the pilot are to hire a consultancy with experience in setting up and training such groups and, working together with the contractors, they can transfer the necessary skills and knowledge. Ideally, after one year the group will be able to independently carry out all maintenance activities.

This will save money in maintenance and will also create a sense of ownership in the scheme amongst local people, which will in turn drive the enthusiasm to keep the site in good condition. At the same time, it will contribute towards the continuation of the project as most volunteers will be briefed on the multiple functions and benefits of the scheme and thus it is hoped it may inspire them to create similar schemes on their own.



Post-construction modifications to a community raingarden

Activity Stage: Post-construction

Pilot Project: Somerset

This story from the Somerset pilot highlights the importance of ensuring projects are followed up post-construction.

The project was the delivery of a raingarden in a communal space in front of local authority housing flats, primarily occupied by retired people. The garden was co-designed in workshops at the local community centre. The ideas from the community were then taken and used to produce technical designs, which were then shared with the community. The local authority own and manage the site, and their community staff were instrumental in getting the project moving, and getting local people involved.

During engagement, the great majority of people in the community were positive about the scheme, but not all of them. As with all negativity, its impact can easily outweigh the positivity a project engenders. We found you must spend an inordinately large amount of time winning these people over, or at least reducing the impact of their negativity. It is easy to see how schemes with less opportunity to engage people can easily run into trouble.

Following design approval and a competitive tender, a local contractor was used to build the raingarden in line with the agreed design. We then organised a 'Planting and Celebration Day', to allow local people help plant out and celebrate their new raingarden. This was a good event well attended through the day by many of the local residents and small businesses. During the event, one of the local people, started to question some elements of the design from a health and safety perspective. A full assessment had taken place, and we took the time to go through this with him, which seemed to be accepted.

We undertook a subsequent visit three months later, and it was clear that the issues had 'taken hold' and the local authority were getting some negative feedback. Health and safety is an interesting and very important element of all schemes and activities. It also prudent to remember that risk perception does vary between people, even professionals themselves. We had one modification planned to reduce moss build up by deepening the channel across the path. We therefore expanded these works to include additional small modifications agreed between ourselves, the council, and the concerned resident. That person has subsequently been very active in tending the garden. Thus, a little additional expense post-construction has achieved an important positive outcome for the scheme as a whole.

Measuring the effectiveness and efficiency of climate adaptation measures

Activity Stage: Post-construction

Pilot Project: World Horti Center, Naaldwijk.

At the World Horti Center in The Netherlands, three different measures have been implemented: a swale, porous paving materials at the parking lots and ground infiltration. These features allow water to infiltrate through the surface and into the soil below. However, there are questions around these measures such as: how large should these facilities be? How can they best be maintained? How efficient are these solutions now and in the future?

During the opening of the World Horti Center in March 2018, demonstration experiments took place. These experiments were carried out during the opening day at different locations by water management students from Lentiz and Rotterdam University of Applied Sciences, supervised by their professors. These tests investigated the efficiency and effectiveness of the climate adaptive measures. The experiments have since been repeated during the spring of 2019, in order to see how the effectiveness and efficiency of the measures change over time. Similar experiments were also undertaken at a different site in the municipality where the porous paving materials have been in place for several more years, again with the same aim of seeing what happens to the effectiveness and efficiency of the measures over time.

The data of these experiments will be analysed and processed and can then be used to compare with data from other tests in the region or internationally.



Useful Resources

The SPONGE 2020 Toolbox is located on the Urban Green Blue Grids website

www.urbangreenbluegrids.com/sponge

Factor C is a way of working which can help practitioners to get started with strategic communication through all the phases of a project: <https://www.communicatierijk.nl/vakkennis/f/factor-c>

Further reading for Pilot 1: Participative adaptation solutions for a city district with social housing and small enterprise

<https://www.urbangreenbluegrids.com/sponge/pilots/agniesebuurt-rotterdam-the-netherlands/>

<https://www.aanpakagniesebuurt.nl/>

<https://www.rotterdam.nl/wonen-leven/aanpak-agniesebuurt/>

Further reading for Pilot 2: Participative adaptation solutions in urban public space

<https://www.urbangreenbluegrids.com/sponge/pilots/redevelopment-of-the-river-scheldt-left-bank/>

<https://www.urbangreenbluegrids.com/sponge/pilots/sint-andries-working-together-towards-a-climate-robust-neighbourhood/>

<https://www.urbangreenbluegrids.com/sponge/pilots/heraanleg-gedempte-zuiderdokken-stad-antwerpen/>

<https://www.urbangreenbluegrids.com/sponge/pilots/co-creating-a-garden-street/>

<https://www.antwerpenmorgen.be/projecten/sponge-2020/over>

<https://www.antwerpenmorgen.be/projecten/gedempte-zuiderdokken/over>

<http://www.agvespa.be/projecten/gedempte-zuiderdokken>

Further reading for Pilot 3: Participative adaptation solutions on a hospital site

<https://www.urbangreenbluegrids.com/sponge/pilots/essex-sponge-2020-pilot/>

Further reading for Pilot 4: Participative adaptation solutions in built areas along a flood-prone river system

<https://www.urbangreenbluegrids.com/sponge/pilots/suds-in-somerset/>

<http://somerset-sponge.org/>

<https://issuu.com/westcountryrivertrust/docs/sponge-2020-taunton-review-2019>

Further reading for Pilot 5: Participative adaptation solutions in commercial city centre

<https://www.urbangreenbluegrids.com/sponge/pilots/southend-on-sea-sponge-2020-pilot-city-beach/>

Further reading for Pilot 6: Participative adaptation solutions in mixed function residential/greenhouse area

<https://www.urbangreenbluegrids.com/sponge/pilots/liermolensloot/>

<https://www.urbangreenbluegrids.com/sponge/pilots/rainlevelr/>

Further reading for Pilot 7: Participative, innovative adaptation solutions in a densely built historic city

<https://www.urbangreenbluegrids.com/sponge/pilots/leiden-lakenpark/>

<https://www.urbangreenbluegrids.com/sponge/pilots/green-roofs-on-leiden-station-area/>

<https://www.urbangreenbluegrids.com/sponge/pilots/leiden-noorderkwartier-oost/>



